

stomach as an index to the remaining function of the gall-bladder and preserve all those that seem capable of functioning.

In conclusion we must remember the inaccuracy of a single stomach analysis in individual cases, also that fractional analysis is far superior, a procedure we propose to carry out in another series of gall-bladder cases. However, much importance should be placed on the high percentage of cases in such a series that show hypo-acidity.

## THE TREATMENT OF HYPERTENSION.

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In a previous paper<sup>1</sup> I discussed the relationship of hypertension to arteriosclerosis and nephritis and described a "type" individual in whom hypertension and hypertensive states are commonly found. I predicated the conception of hypertension as a primary pathological physiological state, due to unknown causes, and that arteriosclerosis and nephritis were not primary but secondary manifestations, consequent to the hypertension itself or to the cause or causes of the hypertension. In this conception, hypertensive states are subject to the same laws of circulatory dynamics as other cardiovascular disorders (*e. g.*, valvular heart disease) and have the same compensated and decompensated phases. I also tried to show that persistent hypertension represents a progressive process; that in all probability most hypertensive states begin as cases of "essential" hypertension, and that unless complicating factors are introduced such cases eventually develop the graver evidences of cardiac and renal insufficiency, affording the clinical picture of arteriosclerosis, coronary disease, chronic nephritis, etc. I also tried to emphasize the lack of relationship between the clinical and laboratory findings in hypertensive states and pathological anatomy, and attempted to show that many of the clinical phases of hypertensive states (especially nephritis) have no predictable pathological substratum, as far as "type" kidney is concerned.

The "type" individual that I have described is a combination of both physical and psychical characters. Briefly, these individuals are overweight, have short necks and are slow and unathletic in bodily movement. Psychically they may be described as prematurely old. They lack the ability to play, either mentally or physically; their imaginations are stunted, their mental range is narrow, but within its limits terribly intense. As their moments of relaxation are few they burn up their energies swiftly, until at

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middle age they are exhausted, and the rest of their life is spent in seeking health. To my mind the states associated with hypertension are essentially by-products of the struggle for existence, the ultimate consequences of "the strenuous life."

With these theses in mind I shall discuss the treatment of hypertension under the following headings in the order of their importance: 1. Instruction of the Patient. 2. Reduction Diet. 3. Exercise and play. 4. Drugs.

1. INSTRUCTION OF THE PATIENT. "Blood-pressure" in the minds of most patients is synonymous with apoplexy and Bright's disease, and it is only too true that many patients on being told that they have increased blood-pressure promptly become confirmed hypochondriacs. Every trivial symptom henceforth is ascribed to the "blood-pressure" and is magnified to the nth degree. The patient becomes morbid, irritable, introspective and becomes a pitiable subject of that mental anguish termed "anxiety neurosis." Such patients would have been better off had they been told nothing.

Extreme tact is therefore necessary in imparting the status of things to the patient. The significance of the malady must be minimized to the utmost. It is important to gauge the temperament of the patient carefully and no more or less should be told than is sufficient to make the patient realize the necessity of following instructions. The best *rapprochement* between physician and patient will be obtained, I believe, by a tactful explanation of the nature and significance of hypertension. Here, as in every other relation between physician and patient, the doctor should be a teacher, as well as a healer.

The advice so lightly and so frequently given, that patients with hypertension should "retire" from business, I deem especially pernicious. The rapid aging of patients after "retirement" is altogether too common an observation not to be taken seriously. I do not know who it was who said that it is the triad—work, play and a sense of responsibility that keeps people mentally young. When these things are suddenly taken away there comes an "early and crabbed age." The advice to retire would not be so bad if an attempt were made to substitute another variety of mental occupation, but, as a rule, no such attempt is made. The consequence is that these poor souls wobble in space and have no anchorage to existence except their illness. Their main occupation thenceforth becomes the elusive quest for health.

For these reasons I advise such patients to stick to their work. In some cases it may be necessary to shorten the hours or to devolve some of the details of the business upon other shoulders. New ventures or vast expansions are prohibited. Occasionally, if the business is not entirely congenial, new lines of replacement activity are suggested, such as work in charity or social service or the culti-

vation of a hobby. Whatever activity is advised it must be something which will give pleasure. An uncongenial task is worse than none at all.

These patients must also be instructed in the very great value of holidays. Holidays are of value not only because they furnish the element of change but also because they afford opportunity to derive new mental impressions and a fresh viewpoint.

2. DIET. The diets that have been recommended for hypertensive states are numerous and various. Most of them revolve around the principle that the protein must be cut to a minimum. As far as I can see a low protein diet for hypertensive states is simply a therapeutic legacy, unfounded on any experimental or empiric evidence. A high protein diet, especially of meats, was considered bad because the split proteins resulting from digestion were supposed to injure the kidney epithelium, damage the blood-vessels, increase the albumin, and thereby bring about a quicker dissolution. I know of no evidence, either clinical or experimental, that unqualifiedly prove these things. Epstein deserves great credit in having shown experimentally and therapeutically that in one type of kidney disease characterized by large quantities of albumin and edema which he terms "parenchymatous nephritis," a high protein diet not only makes the edema disappear but often even cures the malady itself, despite the high retention of non-nitrogenous products in the blood. I have never seen that a high protein diet influences either the quantity of albumin or the hypertension in hypertensive states.

These patients, as I have said, are overweight, due to overeating, lack of exercise and often alcohol.

As the result of my observations I am convinced that the conventional tables for normal weight in proportion to height are altogether too high. As in diabetes, where Allen has shown that patients do better and show a higher tolerance when the weight is reduced to a certain limit, so in hypertension it will be found that, other things being equal, both the subjective and objective improvement will be found to be at their maximum when the patient has reached a certain weight, usually lower than that which these tables prescribe. This weight should be determined in each individual instance, and it will, as a rule, usually be found that an increase in weight, sometimes only of a few pounds, is attended by an aggravation of both the subjective and objective phenomena. In this sense it is necessary to determine a threshold, as in diabetes.

The diet that is ordered is, in many respects, similar to that of a case of diabetes of fair tolerance. The diet is simple and consists principally of fruit, coffee or tea (without sugar), meat, green vegetables, salad, cheese and a limited quantity of bread. In other respects the quantity is not limited. Indeed, there is no reason why these patients should suffer hunger. When a minimum weight is

reached a further loss may be prevented by slowly adding food of higher caloric value. Alcohol is excluded simply because a good reduction cure is impossible with it. I fully agree with Cabot that alcohol has no direct influence upon hypertension or hypertensive states.

3. EXERCISE. I feel convinced that the term "rest" is the most pernicious that can be given to patients with a compensated hypertension. The fear that exercise puts a strain on the heart, and that it increases the so-called noxious products of metabolism, I have proved to my own satisfaction to be unfounded. Rest, it is true, plays a large part in the treatment of hypertension, but only in the periods of circulatory insufficiency and under certain conditions which I shall specify. But patients with hypertension in a state of compensation, no matter what the state of disordered kidney function may be, stand exercise remarkably well. Of course the amount of exercise must be graduated, and the transition from the state of lethargy to that of heightened activity must not be too sudden. It is important that it be systematic. Exercise taken capriciously is not of much avail.

The ideal form of exercise for patients with hypertension is golf. The advantages are many: (a) It is the least strenuous of outdoor sports. (b) It involves a large amount of walking without seeming effort. (c) It is a play and not a task. (d) It generates a sporting instinct, which is reflected in their mental attitude to the problems of life.

If for various reasons a sport cannot be undertaken, walking provides an excellent means of exercise. No specified number of miles is ordered; the patient is told to walk until he is tired; this varies from three to five miles a day. It should be brisk, uninterrupted and done daily. It is remarkable to see how much further a patient can walk than he formerly felt himself capable.

If for one reason or another even walking is not possible, systematic brisk massage will serve up to a certain point as a tolerable substitute for exercise.

The effect of exercise in hypertensive states furnishes another analogy to diabetes. As Allen has shown that exercise increased the tolerance of diabetics, so in hypertension the tolerance, in terms of efficiency, is increased.

The attainment of the minimum weight alone, by diet and exercise, has a truly remarkable effect in cases of compensated hypertension. Their wind is better; their aches disappear; their cardiac reserve increases; they no longer are perpetually tired; their movements are quicker; they sleep better; they are livelier mentally; in a word they become more efficient individuals. Objectively the pulse is slower; slight irregularities, probably due to extrasystoles, disappear. The effect on the blood-pressure is peculiar. The systolic pressure is lowered, but not nearly to the

extent of the diastolic, so that the pulse-pressure is increased, sometimes quite markedly.

There is nothing more hazardous than to try to judge the condition of the patient by the amount of decrease of the systolic pressure; the patient's improvement may be decided, although the systolic pressure remains where it was or is only slightly decreased. A more accurate measure of improvement is in the decrease in diastolic pressure and consequent rise in pulse-pressure. Subjective improvement more nearly goes hand in hand with a decrease in diastolic pressure and a rise in pulse-pressure, and this nearly always is accompanied by a slowing of the pulse. The significance of the slowing of the pulse will be discussed under the heading of "drug treatment." As Goepf correctly observes, it is the ratio and not the height of the pressure that determines prognosis and connotes improvement.

The improvement in circulatory pressures is accompanied by greater diuresis and diminution or even disappearance of the albumin.

*Possibility of Cure.* There is no doubt in my experience that the earlier the patient is seen the nearer to normal the patient can be brought by simple reduction cures. And here I venture to set forth an observation of profound importance: It has often been questioned whether a patient with persistent hypertension can ever be brought back to normal. Most authorities deny that this is possible. But I have met with perhaps a dozen or more instances in which I believe a complete cure has been effected. I mean by that that the blood-pressure has receded to normal limits; the urine has been completely freed from albumin and casts, the heart action is normal and all subjective phenomena, such as dyspnea on exertion, headaches, vertigo, palpitation, have completely disappeared. It is possible that in subsequent years something may yet develop, but thus far the patients are, for all practical purposes, well. All the patients, so far as I can recall, were early cases. The pressures were not high: the systolic varied between 150 Hg. and 170 Hg.; the diastolic was only slightly over 100; the urine showed only a faint trace of albumin and the pulse was not much increased in frequency. The amount of overweight seemed to have had no bearing. I recall one patient who was almost obese.

*Rest.* As I have said, rest plays an important part in the treatment of hypertension. It has three indications: (a) In severe circulatory insufficiencies as revealed by a rapid and irregular heart, hypostatic congestions, oligurias, with marked increase in albumin, edema of the lungs, uremias, dropsy, cerebral manifestations, etc. Here the indications are precisely those of decompensated valvular lesions. (b) In cases of so-called "essential" hypertension, with high systolic and diastolic pressures, a full bounding pulse and accompanied by signs of premonitory cerebral hemorrhage. It is remarkable that the brain seems to be a *locus minoris resistentiae*,

even when the heart and kidney show no pronounced aggravation of signs. (c) In cases of long-standing hypertension, with marked aggravations of all the focal organic signs, with severe dyspnea and general enfeeblement. In these patients, of necessity, the enforcement of an active life would be cruel. Such patients also, I have found, gladly take to the idea of spending one entire day of every week in bed.

4. DRUG TREATMENT. The main desideratum in the treatment of hypertension is, as I have shown, the maintenance of the best possible circulatory function; in other words, to try, if possible, to place the circulatory function in the condition of so-called "compensation." Attempts to reduce the blood-pressure by direct methods long ago have been proved futile. We have drugs that reduce blood-pressure, but their effect is evanescent and no permanent gain is ever derived. With the aid of the therapeutic means I have described, either alone or with the aid of drugs, we do effect lasting decreases in blood-pressure, but these are entirely secondary. It is entirely possible to bring about vast subjective and objective improvement without appreciable effects upon the blood-pressure, nor is this improvement, as I have shown, always proportional to the decreases in pressure. As in valvular and muscular defects of the heart the main drug upon which we rely to maintain a correct circulatory balance is *digitalis*. For many years digitalis was contraindicated in hypertension, because it was supposed to increase blood-pressure, by increasing the power of the muscle and contracting the peripheral bloodvessels. It was therefore considered *the heart stimulant par excellence*. We know that digitalis in the normal heart at all events never directly increases the blood-pressure, except in doses that are far beyond the therapeutic maximum. In recent years the opinion is gaining ground that the main effect of digitalis is expended in affecting the rhythm of the heart. It affects irregular hearts more than the regular; it makes irregular hearts regular and it slows regular hearts to a limited extent. In irregular hearts, as in auricular fibrillation, digitalis, it is true, increases the blood-pressure, but the effect is entirely secondary and conditional upon the improvement in the rhythm. It would lead me too far to discuss the therapeutic indications of digitalis in general, but I may say that my conception of digitalis is that of a regulator and not that of a "stimulant." It may be aptly likened to the timer of an automobile engine.

With the clearer understanding of the effects of digitalis our timidity as regards its employment in hypertension has completely disappeared. Its indications in decompensated states of hypertension with the signs and symptoms which I have outlined already are obvious. In such instances the heart is rapid and usually irregular and the effect, except in cases where the decompensation has gone too far and the reserve force of the heart has been lost,

is almost magical. These patients are the so-called "cardio-nephritides." When all signs of decompensation have disappeared, the principle consists in keeping the heart at a certain rate by the continuous use of digitalis. Each patient must be studied with this end in view, and eventually a rate will be found in which the patient's condition both subjectively and objectively, will be at its best.

But the value of and the indications for digitalis in compensated cases of hypertension have not been generally appreciated. This is a subject worthy of extensive study. I know of the therapeutic benefits that may be obtained, but I am not at all clear as to what physiological forces or agencies these benefits may be ascribed. I can best describe what I mean by citing a concrete example. A patient complains of slight shortness of breath on exertion, pains (very often anginoid) about the precordium and headache or vertigo. An increased blood-pressure is found, a pulse only moderately rapid, between 80 and 90, and perfectly regular; the urine is lessened in amount and contains albumin and casts. Place this patient upon full doses of digitalis and the symptoms disappear, the quantity of urine increases and the albumin decreases; the systolic pressure decreases only a few points, the diastolic pressure a little more. The pulse-rate at rest, however, comes down a varying number of points, from only 4 or 6 to perhaps 10 or 20, depending on the original rate. Now comes the interesting fact: if such a patient is kept at this rate of heart action he will remain well and all the other objective signs, such as the blood-pressure and the condition of the urine, will be found to remain constant. When the pulse at rest remains persistently above this rate the patient will invariably be found to be worse. This rate may be as low as 60 or as high as 90. Individualization of dosage is therefore a paramount necessity.

Why digitalis causes such pronounced improvement I am at a loss to explain. Whether the effect is entirely due to the slowing of the heart, enabling the organ to accumulate a greater reserve force in diastole; whether it increases the velocity of volume flow or whether it improves the coronary circulation, I do not know. But the fact that digitalis is a "real drug" in the treatment of apparently compensated cases of hypertension, as well as those that are decompensated, is to my mind an incontrovertible fact. Its administration requires judicious study and furnishes an abundant field for clinical and experimental investigation.

Digitalis is, of course, useless in cases of hypertension, with a constantly slow pulse (around 60). But a pulse of 74 or 80 need not be considered a contra-indication for its use.

*Nitrites.* The drugs of the nitrite group introduced by Lauder Brunton unquestionably diminish blood-pressure, but the effect is transient. These drugs have, nevertheless, a definite field of usefulness, but only, I believe, as symptomatic remedies. They unques-

tionably relieve what have been termed "spasm" phenomena, such as anginoid attacks, transient aphasias, numbness and paretic symptoms due to cortical irritation, headaches and vertigo. I think most of us have seen patients in whom nitrites, when first administered, cause a temporary increase in headaches. I believe it is a mistake to stop the drug for this reason because I have found that if persisted in the headaches will disappear. If nitrites are given the dose must be given frequently rather than, as usually done, three or four times daily.

*Iodides.* The use of iodides in hypertension was based upon the theory that arteriosclerosis caused hypertension and that the iodide compounds softened the sclerotic vessels and so reduced the tension. Inasmuch as the testimony is overwhelmingly in favor of arteriosclerosis being secondary to the hypertension, and that, furthermore, the iodides cause no appreciable softening of the blood-vessels except perhaps in syphilitic instances, this theory, therefore, lacks support. The advocates of iodide therapy cling to the more recently promulgated theory that these drugs do good because they change the osmotic tension of the blood. But I have found no evidence that they do. At all events in frank hypertensive states I have never been able to convince myself that I have accomplished anything and have therefore practically abandoned their use. The only occasions in which I still employ them are in patients with hypertension with an old history of syphilis and who complain of persistent headache. In such instances it acts better than any other therapeutic measure.

*Chloral Hydrate.* Small doses of chloral hydrate repeated over a long time do unquestionably reduce the blood-pressure, but I believe chloral produces this effect by its sedative action alone, just as morphin will. Patients with hypertension are liable to be "nervous" and are poor sleepers, and I question, therefore, whether chloral acts better in such cases than any of the milder sedatives and hypnotics. My observations lead me to believe that patients with hypertension need their full quota of sleep.

*Caffein.* The view is now generally held that the various caffein salts are pure diuretics and that their effects on the heart are practically negligible. These caffein salts do improve conditions associated with hypertension only in so far as they lessen the embarrassment of the heart by lessening the fluid content of the body. These salts are therefore eminently useful in the decompensated states of hypertension.